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EXAMINER	
MAIS, MARK A	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/625,667	JORDAN ET AL.
	Examiner	Art Unit
	Mark A. Mais	2619

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 07 August 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 24-44 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 24-44 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 24-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Passint et al. (USP 6,101,181).

3. With regard to claim 24, Passint et al. discloses a software-based **[inherent]** cluster-based router **[multiprocessor system with a plurality of processing nodes, col. 3, lines 45-47]** for a package-based communication network **[inherent in routers using routing tables]**, said cluster-based router including N cluster nodes **[multiprocessor system with a plurality of processing nodes, col. 3, lines 45-47]** connected by internal links **[an acrylic network is deadlock free, col. 2, lines 64 to col. 3, line 16]**, characterized by

a plurality of external links for enabling said cluster-based router to exchange traffic with a plurality of nodes of said packet-switched communication network **[each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54]**;

each cluster node of N cluster nodes being adapted to operate as a core router cluster node and as an edge router cluster node **[torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31; inter-nodal network redundancy is interpreted as an edge routing redundancy, Abstract]**;

the internal links connect said cluster nodes in an intra-connection network adapted to provide high path diversity for a plurality of packet processing flows routed over said intra-connection network between edge router cluster nodes **[an acrylic network is deadlock free, col. 2, lines 64 to col. 3, line 16]**;

the cluster nodes connected to external links being adapted to operate as edge router cluster nodes **[each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54; inter-nodal network redundancy is interpreted as an edge routing redundancy, Abstract]**;

whereby a specified routing capacity is obtained for said cluster-based router by selecting a configuration of said intra-connection network **[torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31; each formed network provides a specified routing capacity]**.

4. With regard to claim 25, Passint et al. discloses that each router cluster node is a personal computer **[a desktop computer system (interpreted as a personal computer), col. 8, lines 33-34]**.

5. With regard to claim 26, Passint et al. discloses that the specified configuration comprises an n dimensional topology , each cluster node being connected to 2*n neighboring router cluster nodes **[torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31]**.

6. With regard to claim 27, Passint et al. discloses

an additional cluster node adapted to operate as a management node for managing operation of said cluster nodes of said intra-connection network **[with torus/hypercube topologies, multiple available paths allow the system to bypass broken processors or links, col. 19, line 50 to col. 20, line 13; each router is interpreted as a management node <u>when</u> it is routing a message; thus, it must route the message to the correct destination despite broken processors or links]**; and

dedicated management links for enabling additional cluster node to communicate with said cluster nodes **[Fig. 9 shows a system where each cluster has six links to six neighboring nodes, col. 8, lines 52-58 (claim 16); side-band signaling is interpreted as dedicated links, col. 12, lines 12-22]**.

7. With regard to claim 28, Passint et al. discloses that the management links form a star **[star, mesh, ring, etc. col. 1, lines 43-45]** or bus topology.

8. With regard to claim 29, Passint et al. discloses that each cluster node comprises a plurality of routing function **[interpreted as routing table functionality]** blocks, all of said cluster nodes comprising the same routing function blocks **[the global routing table and the local routing tables provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**.

9. With regard to claim 30, Passint et al. discloses that each cluster node uses an internal addressing process for dynamically determining a node address of each cluster node of said intra-connection network **[the global routing table (external addressing) and the local routing tables (internal tag/addressing; especially for a series of same-tagged/addressed packets) provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**.

10. With regard to claim 31, Passint et al. discloses that the cluster nodes use an external addressing process for dynamically determining a router address for said cluster-based router on said communication network **[the global routing table (external addressing) and the local routing tables (internal tag/addressing; especially for a series of same-tagged/addressed packets) provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**.

11. With regard to claim 32, Passint et al. discloses that the routing functional blocks comprise:

entry packet processing and routing response processing blocks, adapted to route an untagged packet to an output port of the output ports of said cluster node; exit packet processing blocks adapted to route a tagged packet to an output port of the output ports of said cluster node **[the global routing table (external addressing) and the local routing tables (internal addressing; also internal tag/addressing; especially for a series of same-tagged/addressed packets) provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**;

a packet classification unit connected to input port of said cluster node adapted to route said untagged packet received on said input port over an external link to said entry packet processing and routing response processing blocks, and to route said tagged packet received on said input port over an internal link to said exit packet processing blocks **[each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54; torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31; Fig. 9 shows a system where each cluster has six links to six neighboring nodes, col. 8, lines 52-58]**.

12. With regard to claim 33, Passint et al. discloses that the entry processing and routing response blocks include

a decision block for determining if said untagged packet needs to be processed at the cluster node **[inherent if the cluster node handle same-tagged packets]**; and a routing response processing block for performing a route lookup on said untagged packet and routing said untagged packet and routing said untagged packet into an output queue corresponding to said output port **[the global routing table (external addressing) and the local routing tables (internal tag/addressing; especially for a series of same-tagged/addressed packets) provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**.

13. With regard to claim 34, Passint et al. discloses that the entry packet processing and routing response processing blocks include a tag packet block and an attaching a tag to said untagged packet **[with torus/hypercube topologies, multiple available paths allow the system to bypass broken processors or links, col. 19, line 50 to col. 20, line 13; thus, it must route the message to the correct destination despite broken processors or links; this is interpreted as necessarily tagging a packet; e.g., the router tries to match the global ID first to look up in the global table; if unsuccessful, it looks to the local router table (interpreted as encapsulated within one another), col. 15, lines 41-55]**.

14. With regard to claim 35, Passint et al. discloses that the exit processing blocks include a decision block for determining whether said cluster node is a exit edge cluster node **[inherent if the cluster node can use both external addressing and internal addressing]**.

15. With regard to claim 36, Passint et al. discloses that the exit processing blocks includes a tag remove block for removing said tag from said tagged packet if said cluster node is an exit edge cluster node **[inherent if the cluster node can use both external addressing and internal addressing]**.

16. With regard to claim 37, Passint et al. discloses a decision block for determining if said untagged packet is a router management packet and routing said untagged packet to a management node of said cluster based router **[with torus/hypercube topologies, multiple available paths allow the system to bypass broken processors or links, col. 19, line 50 to col. 20, line 13; each router is interpreted as a management node <u>when</u> it is routing a message; thus, it must route the message to the correct destination despite broken processors or links; Fig. 9 shows a system where each cluster has six links to six neighboring nodes, col. 8, lines 52-58; side-band signaling is interpreted as dedicated links for routing router management packets, col. 12, lines 12-22]**.

17. With regard to claim 38, Passint et al. discloses that each tag is provided as either

an optional packet header **[sideband signaling, col. 12, lines 12-22]**,

a packet trailer **[tail micropackets, col. 12, lines 5-8]**, or

an additional header encapsulating the associated packet having cluster router relevance only **[the router tries to match the global ID first to look up in the global table; if unsuccessful, it looks to the local router table (interpreted as encapsulated within one another), col. 15, lines 41-55]**.

18. With regard to claim 39, Passint et al. discloses a method of routing packets over a cluster-based router **[multiprocessor system with a plurality of processing nodes, col. 3, lines 45-47]** with configurable routing capacity and port count **[inherent to routers; e.g., each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54]** comprising the steps of:

selecting a number N **[multiprocessor system with a plurality of processing nodes, col. 3, lines 45-47]** and a configuration for said cluster-based router for obtaining a specified routing capacity and port count for said cluster-based router **[torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31; each formed network provides a specified routing capacity]**;

connecting N cluster nodes via internal links in an intra-connection network according to said cluster-based router **[an acrylic network is deadlock free, col. 2, lines 64 to col. 3, line 16]**;

connected a selected number of cluster nodes designated to operate as edge router cluster nodes over a plurality of external links for enabling connection of said cluster-based router in a communication network **[torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31; inter-nodal network redundancy is interpreted as an edge routing redundancy, Abstract]**; and

routing packets along packet processing flows established between edge router cluster node over a plurality of core router cluster nodes **[each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54; torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31; inter-nodal network redundancy is interpreted as an edge routing redundancy, Abstract]**.

19. With regard to claim 40, Passint et al. discloses that whenever one of said cluster nodes is affected by failure, the remaining cluster nodes take over the functionality of the failed cluster node **[with torus/hypercube topologies, multiple available paths allow the system to bypass broken processors or links, col. 19, line 50 to col. 20, line 13; each router is interpreted as a management node <u>when</u> it is routing a message (claim 17); thus, it must route the message to the correct destination despite broken processors or links]**.

20. With regard to claim 41, Passint et al. discloses using a node MAC address in the intra-connection network and providing each said cluster node with a unique MAC address **[this is inherent to packet-based routing (e.g., TCP/IP routinely using unique MAC addresses)]**.

21. With regard to claim 44, Passint et al. discloses

attaching a tag to each new packet received on an input port of an edge router cluster node **[with torus/hypercube topologies, multiple available paths allow the system to bypass broken processors or links, col. 19, line 50 to col. 20, line 13; thus, it must route the message**

to the correct destination despite broken processors or links; this is interpreted as necessarily tagging a packet; e.g., the router tries to match the global ID first to look up in the global table; if unsuccessful, it looks to the local router table (interpreted as encapsulated within one another), col. 15, lines 41-55]; and

differentially processing packets at each cluster node according to the presence or absence of said tag, whereby said packet is routed towards another cluster node if it is addressed to said another cluster node, or said tag is removed and said packet is routed to an edge node for trans mission over said communication network **[the global routing table (external addressing) and the local routing tables (internal tag/addressing; especially for a series of same-tagged/addressed packets) provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**.

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

23. Claims 42-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Passint et al.

24. With regard to claims 42-43, Passint et al. does not specifically disclose that the node MAC address is set to the lowest MAC address of all ports of said respective cluster node. First, it is inherent to packet-based routing that MAC addresses can be used [e.g., the MAC addresses used in TCP/IP]. Second, Applicants have not disclosed that changing the order of MAC addresses from lowest to highest (as opposed, for example, from highest to lowest) solves any stated problem or is for any particular purpose. It appears that the performance of the setting the MAC address of the router cluster to lowest possible MAC address would result equally well with the internal addressing methodology already disclosed in Passint et al. It is known to those in the art that such a determination must necessarily be dynamic [claim 43]. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Passint et al. to use the internal MAC addressing methodology for the cluster-based routers because such modifications are considered a mere design choice consideration, which fails to patentably distinguish over the prior art of Passint et al. In addition, changing the order of internal MAC addresses [(a) starting from the lowest MAC address versus (b) any MAC address or (c) starting with the highest MAC address] is interpreted as an optimum value for a known process. A discovery of an optimum value for a known process is obvious engineering. *See* In re Aller, 105 USPQ 233 (CCPA 1955).

Response to Arguments

25. Applicant's arguments filed have been fully considered but they are not persuasive.

26. With respect to claims 24 and 39, Applicant argues that Passint et al. fails to disclose a physically connected 12-toroidal cluster node **[See Applicant's Amendment dated August 7, 2007, page 7 paragraph 2 to page 10, paragraph 5]**. The examiner respectfully disagrees.

27. First, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a physically connected 12-toroidal cluster node) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

28. Second, the examiner currently understands that a limitation such as a physically connected 12-toroidal cluster node is not specific enough to not be rendered obvious by the Passint et al. reference. For example, as understood by the examiner, it fails to claim the exact physical connections present and how this is different form the Passint et al reference.

Conclusion

29. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

30. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

31. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(a) Lee et al. (USP 6,718,428), Storage array interconnection fabric using a torus topology. This reference shows a balanced toroidal cluster.

(b) Lee (USP 7,000,033), Mapping of nodes in an interconnection fabric. This reference shows a balanced toroidal cluster.

(c) Lee et al. (USP 7,027,413), Discovery of nodes in an interconnection fabric. This reference shows a balanced toroidal cluster.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Mais whose telephone number is 572-272-3138. The examiner can normally be reached on M-Th 5am-4pm.

33. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing F. Chan can be reached on 571-272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

34. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MAM
November 15, 2007

Wing F. Chan
11/26/07
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SUPERVISORY PATENT EXAMINER